

**U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
REGULATORY BRANCH**

CHECKLIST FOR REVIEW OF MITIGATION PLAN

(Subject to periodic revision)

Project: _____ File No: _____ PM: _____
City: _____ State: _____
Plan Title, Preparer, Date: _____

The following items should be included in the mitigation plan. Any appropriate items not included in the final plan should be included in the permit as special conditions.

- ☐ Mitigation plan is submitted as one complete document.
- ☐ Site location map - Include a map depicting the geographic relationship between the impact site and the proposed mitigation site, and a vicinity map of greater than or equal to a scale of 1 inch equals 2,000 feet.

Impact area:

- ☐ Describe wetland acreage at each impact site and length of any streams at the impact sites.
- ☐ Describe wetland classes at each impact site.
- ☐ Describe wetland functions and values at each impact site.
- ☐ Describe type and purpose of work at each impact site.

Mitigation area:

- ☐ Describe wetland acreage proposed at each mitigation site.
- ☐ Describe wetland classes proposed at each mitigation site.
- ☐ Describe functions and values proposed at each mitigation site.
- ☐ Design Constraints - Project, landscape features, or public issues that control or otherwise influence the design of the mitigation area.

[] The following language is included in the narrative portion of the mitigation plan, when deemed necessary by the Corps:

A wetland scientist will be on-site to monitor construction of the wetland mitigation area(s) to ensure compliance with the mitigation plan.

Hydrology:

[] The expected seasonal depth, duration, and timing of both inundation and saturation must be described for each of the proposed habitat zones in the mitigation area (particularly related to root zone of the proposed plantings). If shallow monitoring wells are used to develop this rationale, the observations must be correlated to local soil morphologies, rooting depths, water marks or other local evidence of flooding, ponding or saturation, and reflect recent rainfall conditions.

[] Indicates if system is groundwater or surface water driven and provides substantiation.

Grading Plan:

Plan View:

[] Existing and proposed grading plans for wetland portion of mitigation area with 6" contour interval. All other areas may have 1-2' contours.

[] Where microtopographic variation is planned, the proposed maximum differences in elevation should be specified. The plan does not need to show the locations of each pit and mound as long as a typical cross-section and approximate number of pits and mounds is given for each zone.

[] The scale should be in the range of 1"=20' to 1"=100', depending on the size of the site.

[] All items on the plan should be legible (i.e. on an 8 ½" x 11" plan, use a 9 font).

[] Section View - representative cross section plans showing the existing and proposed grading plan, expected range of shallow groundwater table elevations or surface water level consistently expected.

Topsoil:

[] Proposed source of topsoil in mitigation area.

[] At least six to twelve inches of natural or manmade topsoil, depending on on-site conditions, in all wetland mitigation areas.

[] Natural topsoil proposed to be used for the creation/restoration/enhancement of wetlands consists of at least 12% organic carbon content (by weight). The percent organic carbon content may be adjusted based on individual site conditions. Manmade topsoil used for the creation/restoration/enhancement of wetlands consists of a mixture of equal volumes of organic and mineral materials.

[] Identifies subsurface soil conditions (sand, clay, bedrock, etc.).

[] The following language is included in the mitigation plan, either in the drawings or in the narrative portion of the plan:

At least [applicable number] inches of natural or manmade topsoil shall be installed in wetland mitigation areas. Natural topsoil shall consist of at least 12 percent organic carbon content by weight. Manmade topsoil shall consist of a mixture of equal volumes of organic and mineral materials. Clean leaf compost is the preferred soil amendment to achieve these standards. If other soil amendments are more readily available than clean leaf compost they can be used to meet the requirement for 12 percent organic carbon content.

Erosion Controls:

[] The following language is included in the mitigation plan, either in the drawings or in the narrative portion of the plan:

Temporary devices and structures to control erosion and sedimentation in and around mitigation sites shall be disassembled and properly disposed of before 1 November three full growing seasons after planting. Sediment collected by these devices will be removed and placed upland in a manner that prevents its erosion and transport to a waterway or wetland.

Coarse Woody Debris:

[] The following language is included in the mitigation plan, either in the drawings or in the narrative portion of the plan:

A supply of dead and dying woody debris (logs and stumps) shall cover at least 1% of the ground throughout the mitigation sites after the

completion of construction of the mitigation sites. As much as possible, these materials will be in various stages of decomposition and salvaged from natural areas cleared for the other elements of the project. These materials should not include species shown on the attached list of invasive species.

Planting Plan:

[] Plans use scientific names.

[] Plant materials are native and indigenous to the northeastern region of the United States. Native planting stock from the immediate vicinity of the project is ideal. Whenever possible, plants should be salvaged from wetlands and uplands cleared by the project. In some circumstances, local "scavenging" of wetlands may be permissible, but care is necessary to avoid jeopardizing established natural habitats. Be aware that state or local permits may be required to "scavenge" natural wetlands for planting stock. No cultivars shall be used.

[] Vegetation community types or zones are classified in accordance with Cowardin, et al. (1979)¹ or other similar classification system.

[] Plan View - proposed locations of planted stock. This may be illustrated with polygons and the number of plants or rate of seeding within the polygon. The scale should be in the range of 1"=20' to 1"=100', depending on the size of the site.

[] More than 50% of the plantings in each zone are structural determinants for the community type designated for that zone with emphasis on species unlikely to "volunteer".

[] Within planting cells, woody stock are proposed to be bare-rooted or container-grown.

[] Woody stock is proposed to be planted in densities not less than 400 per acre for trees and 600 per acre for shrubs.

[] Within planting cells, herbaceous stock is proposed to be planted in densities not less than the equivalent of 3 feet on center for species which spread with underground roots; 2 feet for species which form clumps.

[] Seed mix composition is provided. The list of species does not include any species in the attached list of invasives.

[] Section View - representative cross section plans showing vegetative community (e.g., forested, shrub swamp, etc.) zones.

[] The following language is included in the mitigation plan, either in the plan view or in the narrative portion of the plan:

Only plant materials native and indigenous to the region shall be used. Species not specified in the mitigation plan shall not be used without written approval from the Corps. Plant species on the attached list shall not be used in and within 100 feet of mitigation sites.

[] The following language is included in the mitigation plan, either in the drawings or in the narrative portion of the plan:

During planting, a qualified professional may relocate up to 50 percent of the planting cells if as-built site conditions would pose an unreasonable threat to the survival of plantings installed according to the mitigation plan. The planting cells shall be relocated to locations with suitable hydrology and soils and where appropriate structural context with other planting cells can be maintained. The term planting cells means the discrete clusters of plants shown on the approved planting plan. If plant species are not planted in discrete clusters, the planting cell is the entire mitigation site.

[] Other - Specific staff recommendations related to planting.

Invasive and Noxious Species:

Projects should avoid introducing or increasing the risk of invasion by unwanted plants. Soils disturbed by projects are very susceptible to invasion by undesirable species. Be particularly alert to the risk of invasion on exposed mineral soils. Exposed mineral soils may result from excavation or filling. Noxious species often get a foothold along project drainage features where the dynamics of erosion and accretion prevail. Along saltmarshes, be especially alert to the project's influence on freshwater runoff. Frequently, *Phragmites australis* invasion is an unanticipated consequence of freshwater intrusion into the saltmarsh.

[] Risk -- the discussion includes an assessment of the potential for invasion of the wetland by the species listed below.

[] Constraints - identifies regulatory and ecological constraints that influence the design of any plan to control invasive plants by biological, mechanical, or chemical measures.

[] Control Plan - describes the strategy to control, or recognize and respond to the invasion of the mitigation site by Common Reed *Phragmites australis* and Purple Loosestrife *Lythrum salicaria*. Any other species identified as a problem at the site should also have a control plan. Controls may be mechanical (pulling, mowing, or excavating on-site), chemical (herbiciding), and biological (planting fast-growing trees and shrubs for shading or releasing herbivorous insects).

[] During the first few years, while the designed wetland vegetative zones become established, they are susceptible to invasion. A number of plants are known to be especially troublesome in this regard. To reduce the immediate threat and minimize the long-term potential of degradation, the following species are not included as planting stock in the overall project.¹ These species do not need to be actively removed from the site unless specified:

a. Herbs:

<i>Aegopodium podagraria</i>	Goutweed or Bishop's weed
<i>Alliaria petiolata</i>	Garlic mustard
<i>Ampelopsis brevipedunculata</i>	Porcelain berry
<i>Anthriscus sylvestris</i>	Chervil
<i>Cabomba caroliniana</i>	Fanwort
<i>Cardamine impatiens</i>	Bushy rock-cress
<i>Centaurea biebersteinii</i>	Spotted knapweed
<i>Coronilla varia</i>	Crown vetch
<i>Echinochloa crusgalli</i>	Barnyard grass
<i>Egeria densa</i>	Giant waterweed
<i>Epilobium hirsutum</i>	Hairy willow-herb
<i>Euphorbia cyparissias</i>	Cypress spurge
<i>Festuca filiformia</i>	Hair fescue
<i>F. ovina</i>	Sheep fescue
<i>Glaucium flavum</i>	Sea- or horned poppy
<i>Glyceria maxima</i>	Sweet reedgrass
<i>Hesperis matronalis</i>	Dame's rocket
<i>Iris pseudacorus</i>	Yellow iris

¹ Many species on this list are from page 22 of "A Guide to Invasive Plants in Massachusetts" by Pamela B. Weatherbee, Paul Somers and Tim Simmons of the Massachusetts Biodiversity Initiative published by the Commonwealth of Massachusetts Division of Fisheries and Wildlife, 6/98.

<i>Lotus corniculatus</i>	Birdsfoot trefoil
<i>Lysimachia nummularia</i>	Moneywort
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Myosotis scorpioides</i>	True forget-me-not
<i>Myriophyllum heterophyllum</i>	Variable water-milfoil
<i>M. spicatum</i>	Eurasian water-milfoil
<i>Najas minor</i>	Lesser naiad
<i>Nymphoides peltata</i>	Yellow floating heart
<i>Poa compressa</i>	Canada bluegrass
<i>Phalaris arundinacea</i>	Reed canary-grass
<i>Phragmites australis</i>	Reed grass, Phragmites
<i>Polygonum aubertii</i>	Silver lace-vine
<i>P. cuspidatum</i>	Japanese knotweed
<i>Potamogeton crispus</i>	Curly pondweed
<i>Pueraria montana</i>	Kudzu
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rorippa nasturtium-aquaticum</i>	Watercress
<i>Rumex acetosella</i>	Sheep-sorrel
<i>Sedum telephium</i>	Live-forever or Orpine
<i>Solanum dulcamara</i>	Bittersweet nightshade
<i>Thymus pulegioides</i>	Wild thyme
<i>Trapa natans</i>	Water-chestnut
<i>Tussilago farfara</i>	Coltsfoot
<i>Typha latifolia</i> ²	Common or Broad-leaved cattail
<i>T. angustifolia</i> ²	Narrow-leaved cattail
<i>Verbascum thapsus</i>	Common mullein
 b. Woody Plants:	
<i>Acer platanoides</i>	Norway maple
<i>A. pseudoplatanus</i>	Sycamore maple
<i>Actinidia arguta</i>	Kiwi vine
<i>Ailanthus altissima</i>	Tree-of-heaven
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Berberis thunbergii</i>	Japanese barberry
<i>B. vulgaris</i>	Common barberry
<i>Catalpa speciosa</i>	Western catalpa
<i>Cynanchum louiseae</i>	Black swallow-wort

² *Typha* spp. are native species which provide good water quality renovation and other functions/values. However, they are aggressive colonizers which, given the opportunity, will preclude establishment of other native species. They are included in this list as species not to be planted, not because they are undesirable in an established wetland, but to provide opportunities for other species to become established. It is likely they will eventually move in without human assistance.

<i>Elaeagnus angustifolia</i>	Russian olive
<i>E. umbellata</i>	Autumn olive
<i>Euonymus alata</i>	Winged euonymus
<i>Humulus japonicus</i>	Japanese hops
<i>Juniperus virginiana</i>	Red cedar
<i>Ligustrum obtusifolium</i>	Japanese privet
<i>L. vulgare</i>	Common/hedge privet
<i>Lonicera maackii</i>	Amur honeysuckle
<i>L. japonica</i>	Japanese honeysuckle
<i>L. morrowii</i>	Morrow's honeysuckle
<i>L. tartarica</i>	Tatarian honeysuckle
<i>L. x bella</i>	Morrow's X Tatarian honeysuckle
<i>L. xylosteum</i>	European fly-honeysuckle
<i>Morus alba</i>	White mulberry
<i>Populus alba</i>	Silver poplar
<i>Rhamnus cathartica</i>	Common buckthorn
<i>R. frangula</i>	Glossy buckthorn
<i>Robinia pseudoacacia</i>	Black locust
<i>Rosa multiflora</i>	Multiflora rose
<i>R. rugosa</i>	Rugosa rose
<i>Wisteria floribunda</i>	Wisteria

ATV Use:

- [] No ATV use in immediate vicinity, or if so, control measures addressed.
- [] If there is a potential for ATV access at the site, the mitigation plan shows the locations of barriers placed at access points to the mitigation sites to prevent vehicles from damaging the sites.

Monitoring Plan:

The following language must be included in the mitigation plan to track mitigation success and correct problems as appropriate. Once the final mitigation plan is incorporated into the permit, the permit will require full implementation of the mitigation plan, including remedial measures during the first three growing seasons to try to make the mitigation succeed. Unsuccessful mitigation does not in and of itself constitute permit non-compliance. Failure to implement the plan and remedial measures, however, does.

[] The following language is included in the narrative portion of the mitigation plan:

MONITORING

For each of the first three full growing seasons following construction of the mitigation site(s), the site(s) shall be monitored and monitoring reports shall be submitted to the Corps no later than December 15 of the year being monitored. The reports shall answer the following four success-standard questions and shall address in narrative format the items listed after the four questions. The reports shall also include the four monitoring-report appendices listed below. The first year of monitoring shall be the first year that the site has been through a full growing season after completion of construction and planting. For these special conditions, a growing season starts no later than May 31. However, if there are problems that need to be addressed and if the measures to correct them require prior approval from the Corps, the permittee shall contact the Corps by phone (1-800-362-4367 in MA or 1-800-343-4789 in ME, VT, NH, CT, RI) or letter as soon as the need for corrective action is discovered.

Remedial measures shall be implemented to attain the four success standards described below within three growing seasons after completion of construction of the mitigation site(s). Measures requiring earth movement or changes in hydrology shall not be implemented without written approval from the Corps.

1) Do at least three-quarters of all planting cells at each mitigation site have at least 35% planting survival? To answer this question, first compute the percent species survival for each planting cell. Percent species survival equals 100 times the number of surviving plants in a planting cell divided by the number of plants originally planted in that cell. Next multiply 100 times the number of planting cells with percent species survival equal to or greater than 35% divided by the total number of planting cells in the mitigation site. The term planting cells means the discrete clusters of plants shown on the approved planting plan. If plant species are not planted in discrete clusters, the planting cell is the entire mitigation site. Quadrat samples may be substituted for direct measurement of the number of plants if, for example, the site is greater than one acre or herbaceous cover obscures direct observation and tally.

2) Does each mitigation site(s) have at least 80% areal cover, excluding planned open water areas, by noninvasive hydrophytes? For the purpose of this success standard, invasive species of hydrophytes are:

Cattails -- *Typha latifolia*, *T. angustifolia*, *T. glauca*;
Common Reed -- *Phragmites australis*;
Purple Loosestrife -- *Lythrum salicaria*; and
Reed Canary Grass -- *Phalaris arundinacea*.

3) Are Common Reed (*Phragmites australis*) and/or Purple Loosestrife (*Lythrum salicaria*) plants at the mitigation site(s) being controlled?

4) Are all slopes within and adjacent to the mitigation site(s) stabilized?

Items for narrative discussion:

Describe the monitoring inspections that occurred since the last report.

Concisely describe remedial actions done during the monitoring year to meet the four success standards – actions such as removing debris, replanting, controlling invasive plant species (with biological, herbicidal, or mechanical methods), regrading the site, applying additional topsoil or soil amendments, adjusting site hydrology, etc. Also describe any other remedial actions done at each site.

Give visual estimates of (1) percent vegetative cover for each mitigation site and (2) percent cover of the invasive species listed under Success Standard No. 2, above, in each mitigation site.

What fish and wildlife use the site(s) and what do they use it for (nesting, feeding, shelter, etc.)?

By species planted, describe the general health and vigor of the surviving plants, the prognosis for their future survival and a diagnosis of the cause(s) of morbidity or mortality.

What remedial measures are recommended to achieve or maintain achievement of the four success standards and otherwise improve the

extent to which the mitigation site(s) replace the functions and values lost because of project impacts?

MONITORING-REPORT APPENDICES:

Appendix A -- A copy of this permit's special conditions.

Appendix B -- An as-built planting plan showing the location and extent of the designed plant community types (e.g., shrub swamp). Within each community type the plan shall show the location and extent of the planting cells and each species planted within the cells.

Appendix C -- A vegetative species list of dominant volunteer species in each plant community type. Dominant volunteer species should include those that cover over 5% of their vegetative layer.

Appendix D -- Representative photos of each mitigation site taken from the same locations for each monitoring event.

Assessment Plan:

[] The following language is included in the narrative portion of the mitigation plan:

ASSESSMENT

A post-construction assessment of the condition of the mitigation site(s) shall be performed after the first five full growing seasons following completion of construction of the mitigation site(s). "Growing season" in this context begins no later than June 1st. To ensure objectivity, the person(s) who prepared the annual monitoring reports shall not perform this assessment without written approval from the Corps. The assessment report shall be submitted to the Corps by December 15 of the year the assessment is conducted.

The post-construction assessment shall include the four assessment appendices listed below and shall:

Summarize the original or modified mitigation goals and discuss the level of attainment of these goals at each mitigation site.

Describe significant problems and solutions during construction and maintenance (monitoring) of the mitigation site(s).

Identify agency procedures or policies that encumbered implementation of the mitigation plan. Specifically note procedures or policies that contributed to less success or less effectiveness than anticipated in the mitigation plan.

Recommend measures to improve the efficiency, reduce the cost, or improve the effectiveness of similar projects in the future.

ASSESSMENT APPENDICES:

Appendix A -- Summary of the results of a functions and values assessment of the mitigation site(s), using the same methodology used to determine the functions and values of the impacted wetlands.

Appendix B -- Calculation of the area of wetlands in each mitigation site using the delineation method employed by the Corps of Engineers. Supporting documents shall include (1) a scaled drawing showing the wetland boundaries and representative transects and (2) datasheets for corresponding data points along each transect.

Appendix C -- Comparison of the area and extent of delineated wetlands (from Appendix B) with the area and extent of created wetlands proposed in the mitigation plan. This comparison shall be made on a scaled drawing or as an overlay on the as-built plan. This plan shall also show the major vegetation community types.

Appendix D -- Photos of each mitigation site taken from the same locations as the monitoring photos.

Other Comments:

ERU Scientist: _____ Date Plan Reviewed: _____